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maturity. In my judgment it is clearly the duty of the state to adjust taxation on growing stands of timber, provide adequate protection against fire and other destructive agents, instruct the public in silvicultural methods and encourage reforestation by providing planting stock. In return for this assistance by the public, forest land must by law be subject to public regulation which will insure regrowth of acceptable species. Furthermore this public regulation must be in the hands of local boards whose function it is to interpret the requirements of the law in their particular locality.

Constructive state forest legislation is only in its beginning. It is your duty and mine to assist in every way we can in making regrowth possible. First, as American citizens and voters we should work for increased publicly owned forests by the nation, by states, and by local communities. Second, as American citizens and voters we should work for the reasonable public regulation of all forest lands, based upon a system of cooperation between the public and the private owner that will make regrowth possible without, in the long run, entailing financial loss upon the owner. Third, as American citizens and voters we should work for more liberal financial support of the entire forestry movement by both the nation and the state.

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OCCURRENCE OF PLEISTOCENE VERTEBRATES IN AN ASPHALT DEPOSIT NEAR MCKITTRICK, CALIFORNIA

PLEISTOCENE mammalian remains from asphalt deposits located along the southwestern border of the Great Valley of California have been known since 1865, when Joseph Leidy reported the occurrence of two horse teeth from near Buena Vista Lake and referred the specimens to *Equus occidentalis*. Further remains of this species from the region of Buena Vista Lake were described and figured by Leidy¹ in 1873. Thirty years

later J. C. Merriam² described a fragmentary lower jaw of the dire wolf, *Aenocyon dirus*, that apparently came from an asphalt bed in Tulare County, California.

The construction of the Taft-McKittrick highway in the petroleum producing belt southwest of Bakersfield has brought to light a fossiliferous bed of asphalt on the southern outskirts of the town of McKittrick. The deposit is apparently located in a narrow zone of asphaltic material shown on the geologic maps³ of the McKittrick oil region as traversing the foothill region immediately southwest of McKittrick. As mapped by Arnold and Johnson this brea belt is associated areally with Pliocene and Miocene marine beds and is found also in contact with the alluvium of McKittrick Valley.

The occurrence of bones in asphalt near McKittrick was known for many years to the Department of Palæontology of the University of California. Recently John B. Stevens explored the deposit and secured a number of specimens that were kindly presented to the University. During the past summer a field party from the Museum of Palæontology with cooperation and support of the Carnegie Institution of Washington, commenced excavations and made additional collections. Grateful acknowledgment should be made to the Midway Royal Oil Company for permission to excavate and for valuable assistance rendered during the progress of the work.

In the brea deposit near McKittrick a surface stratum of hardened asphaltic material reaches in places a thickness of several feet. This layer contains numerous remains of birds and mammals, apparently represented by p. 94; Rept. U. S. Geol. Surv. Terr., pp. 242-244, pl. 33, fig. 1, 1873.

² Merriam, J. C., Univ. Calif. Publ. Bull. Dept. Geol., Vol. 3, pp. 288-289, pl. 30, fig. 2, 1903.

³ Arnold, R., and Johnson, H. R., "Preliminary report on the McKittrick-Sunset Oil Region, Kern and San Luis Obispo Counties, California," pl. 1, U. S. Geol. Surv. Bull. 406, 1910; Pack, R. W., "The Sunset-Midway Oil Field, California, Part I., Geology and Oil Resources," pl. 2, U. S. Geol. Surv. Prof. Paper 116, 1920.

¹ Leidy, J., *Proc. Acad. Nat. Sci. Phila.*, 1865,

ing the Recent fauna, and overlies the deposit in which Pleistocene vertebrates are found. In excavating the older bed dense accumulations of mammalian remains were encountered. This deposit is in general comparable to these occurring at Rancho La Brea. The exhumed material was, however, not so well preserved as that from the asphalt bed near Los Angeles. This seems due, in a measure, to a prevailing earthy matrix showing somewhat less impregnation by petroleum than in the Rancho La Brea beds.

A small collection of bird remains from the McKittrick deposit was submitted to Dr. L. H. Miller for examination. A preliminary statement has been kindly given by Dr. Miller as follows:

1. Of the ten species thus far determined, six are aquatic or semi-aquatic in habit. With more careful examination to determine exact identity of ducks and waders, this proportion will be increased. Quite the reverse is true of the Rancho La Brea beds.

2. The golden eagle (*Aquila chrysaetos*) is the most abundant species of land bird. One hawk (*Circus*), one caracara (*Polyborus*), and two falcons (*Falco sparverius* and *F. near fuscocerulescens*) are the only other raptors. No owls or vultures appear in the collection.

3. *Parapavo* is not represented. A single quail bone represents the great group of Gallinæ.

4. Shore birds (Limicolæ), so rare in the Rancho La Brea beds, are very abundant here. More specimens of this group are present in the collection of 100 specimens from McKittrick than in all the 50,000 examined from Rancho La Brea.

5. So far as examined there appear no extinct or extra-limital species not found at Rancho La Brea. On the other hand *Teratornis*, *Parapavo*, the great list of condors, vultures, eagles, old world vultures, and owls are thus far lacking.

6. The caracara, the indeterminate falcon, and the two storks, *Ciconia* and *Jabiru*, give the same suggestion of semitropical climate as in the case of Rancho La Brea.

Following is a provisional list of the Pleistocene mammalian fauna known from the McKittrick locality:

Enocyon dirus (Leidy)

Canis, near *ochropus* Esch.

Felis atrox Leidy

Felis, near *daggetti* Merriam

Arctotherium, near *simum* Cope

Myiodon, sp.

Equus occidentalis Leidy

Antilocapra?, sp.

Bison, sp.

Camel, slender limbed form

Mastodon, sp.

Several of the mammalian species listed above are known from Rancho La Brea. The dire wolf (*Enocyon dirus*), the great lion (*Felis atrox*) and the horse (*Equus occidentalis*) also occur in the asphalt beds near Los Angeles. Machaerodont cats have not been recognized at the McKittrick locality. The bear (*Arctotherium*) and the ground sloth (*Myiodon*) occur in both deposits, although the forms represented at McKittrick may be specifically separable from the types found at Rancho La Brea. A camel with slender limbs is certainly distinct from the large *Camelops hesternus* found at Rancho La Brea.

Further collecting at the McKittrick locality will bring out the relationship between this assemblage and the Rancho La Brea fauna. The contrasting features that are recognized at present may result from a geographic separation of the two asphalt deposits. It is probable that the environmental conditions prevailing in the southern portion of the Great Valley of California during the Pleistocene were somewhat unlike those existing in the vicinity of Rancho La Brea. On the other hand, it may be that the faunal differences are to be interpreted as indicating separate stages of the Pleistocene.

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SPECIAL OIL-IMMERSION OBJECTIVES FOR DARK-FIELD MICROSCOPY

DARK-FIELD microscopy was introduced by Joseph Jackson Lister in 1830, and by the Rev. J. B. Reade in 1837. The optical principles were clearly enunciated by F. H. Wenham in 1850-1856, and apparatus substantially as now employed was made and described by him for use with high powers.